

# **Benefit Cost Analysis of The Maternal Depression Project in Gadsden County, Florida**

**Completed By:**

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## **Introduction**

The objective of this research is to determine, through benefit cost analysis, whether screening and intervention has had a positive effect for high-risk depressed women in the Gadsden County community. The four-year (7/01/2001-5/31/2005) Gadsden Maternal Depression Project was initiated on the basis of a Health Resources and Services Administration (HRSA) grant and state funding ear-marked for Gadsden County. Goals of the Maternal Depression Project were: 1) to increase awareness of maternal depression in Gadsden County, 2) to increase screening for depression for pregnant women or for women who had given birth in the community, and 3) to provide treatment for those women who tested positive for the depression screening.

Data collection was begun during fiscal year 2001. The first goal of the Maternal Depression Project was to increase community awareness. This is ongoing, and has been implemented by staging an aggressive community campaign to advise the community about prenatal depression, its effect and available resources. The campaign was conducted in conjunction with the Health Department, Early Head Start, Gadsden Healthy Families, and other interested community groups and involved four trainings, working with two schools, several churches, and business/community leaders, participating in three local health fairs, 500 perinatal depression pamphlets, brochures and other resources, and WFSU radio coverage. Increase awareness regarding depression is evidenced by the dramatic increase in referrals (132 for January 1, 2002-June 30, 2003) at the Gadsden County Health Department.

Regarding the second goal, the number of women referred for mental health services that are depressed in Gadsden County has increased over the project period. In 2001, Early Head Start initially screened 17 women for depression. The total number of referrals that occurred independent of the screening tool was 78 for year 2002, and 132 for January 1, 2002 – June 30, 2003. This was approximately a seven-fold increase in the referral rate when compared to 2001.

Concerning goal three, 51 women received individual counseling for depression from January 1, 2002 – June 30, 2003. A client satisfaction survey was mailed, with a response rate at 15%. Of the clients that responded to the survey, 80% indicated that they currently do not experience depression and credit project services for this improvement.

During the time period January 1, 2002 – June 30, 2003 the following data (Tables 1, 2 and 3) was collected on program participants engaged in screening and counseling services pertaining to maternal depression:

**Table 1. January 1, 2002 – June 30, 2003 Screening Totals**

<b>Total Number of Adults Screened with EPDS*</b>	<b>Number of Adults who Screened Positive for Depression</b>	<b>Number of Adults Referred by Self/Others</b>	<b>Percent of Adults who Screened Positive</b>
244	89	132	36%

\*Edinburgh Postnatal Depression Scale (EPDS)

**Table 2. January 1, 2002 – June 30, 2003 Counseling Totals**

<b>Number of Unduplicated Clients Treated</b>	<b>Number of Appointments for Counseling</b>	<b>Number of Counseling Sessions Conducted</b>	<b>Number of Missed Sessions</b>
51	663	396 (60%)	267 (40%)

**Table 3. January 1, 2002 – June 30, 2003 Contact Totals\***

<b>Number of Phone Contacts with Clients</b>	<b>Number of Other (Brief Face to Face or Letter) Contacts with Clients</b>	<b>Total Number of Client Contacts</b>	<b>Number of Phone Contacts with Potential Clients</b>	<b>Number of Other Contacts with Potential Clients</b>	<b>Total Number of Contacts with Clients and Potential Clients</b>
955	143	1,098	1,232	201	2,531

\* Based on data extrapolated from 10/1/2002 – 9/30/2003 percentages of contacts.

For the Gadsden County Maternal Depression Project there are two entry portals for treatment; via direct screening or via referrals by others. For January 1, 2002 through June 30, 2003, the number of women offered counseling services was 221 (132 + 89). The group of 132 referrals were not formally screened for depression, but were viewed as exhibiting some symptoms of depression, and were offered counseling services. There were a total of 244 adults screened for depression. The birth rate in Gadsden County is approximately 700 live births per year (or approximately 1,050 for the time period)<sup>1</sup>. Thus, the number of adults screened represents 23% of the total pregnant population in Gadsden County. Of the total 244 adults screened, 89 (36% of the tested population) tested positive for depression. Although the rate of depression (36%) is greater than the norm (10-16%), the increased rate of poverty in Gadsden County would suggest a higher than normal rate of depression. Due to poverty, among other factors, the women also

<sup>1</sup> Linda Traum, LCSW, Center for Prevention and Early Intervention Policy (CPEIP)

stemmed from a population at high risk for depression. Depression typically results in lethargy which combined with the lack of transportation and pervasive poverty in the community could explain the high level of missed sessions (40%).

During the project’s time period, 51 women chose to undergo treatment (out of the 89 that screened positive for depression and 132 women who were referred by others to the project). On average, there is a ratio of 5.5:1 or approximately 5.5 positive depression screens (including referrals) for every new client.<sup>2</sup> The 51 clients attended a total of 396 counseling sessions (or an average of 7.8 sessions per client). Depending on the level of severity of depression, some women required an extensive number of counseling sessions, and others required a fewer number. Approximately 12% of the 51 clients received medication.

In addition, 1,098 contacts were made with the client population, with approximately 87% comprising phone contacts. There were an additional 1,232 phone contacts and 201 “other” contacts (brief face-to-face and letters) to potential clients. Thus, the client and potential client total was 2,531.

As depicted in Table 4, 24 (or 47%) women successfully completed treatment in the program. In addition, 14 women are on-going, still in treatment (27%) and are potential completers in the future. A quarter of women (13) either moved or dropped out, unsuccessfully completing treatment. In summary, almost 75% women either completed or will potentially complete treatment.

**Table 4. Completion Status of Women for January, 2002 – June, 2003**

<b>Completion Level</b>	<b>Number</b>	<b>Percentage</b>
Successfully completed treatment	24	47%
Ongoing, still in treatment	14	27%
Did not successfully complete treatment due to moving or lost contact	13	25%
Total	51	100%

The data for this research was gathered through a survey of client records (see Appendix A) collected from 51 perinatal clients receiving treatment for depression. The survey design captured some demographic information including employment, education and training, family status including location of other children in the household, and pregnancy outcomes including pregnancy status at time of treatment, baby birth weight and future family planning options.

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<sup>2</sup> Linda Traum, LCSW, Center for Prevention and Early Intervention Policy (CPEIP), based on Oct. 1, 2002 – September 30, 2003 numbers.

## Literature Review

Maternal depression has an adverse effect not only on mothers, but on children as well. Dr. Dell, of Duke University, called postpartum depression (PPD) “the most under-recognized, under-diagnosed, and under-treated obstetrical complication in America”. PPD is a mood disorder that affects approximately 10% – 16% of new mothers. It can last for months to over a year after giving birth. One pilot study assessed the efficacy of a group intervention in reducing the likelihood of postpartum depression in pregnant women on public assistance with at least one risk factor for postpartum depression (Zlotnick, Johnson, Miller, Perlstein & Howard, 2001). The intervention was based on interpersonal therapy (IPT), a form of psychotherapy in which therapists first help clients identify interpersonal problems (stress) that cause depression and then work with the clients to resolve those problems. In a sample of financially disadvantaged women, the researchers found that a four-session interpersonally-oriented group intervention was successful in preventing the occurrence of major depression during a three months postpartum period.

As a group, the children of depressed mothers are at high risk of developmental difficulties. A growing amount of research is focusing on maternal depression and its effects on newborns, infants and young children. Research has shown that infants born to depressed mothers have elevated stress hormones (cortisol levels), brain activity suggestive of depression, show little facial expression and have other depressive symptoms such as loss of appetite and sleep. The infants, in other words “mirror the depressive symptoms that their mothers exhibit”, said Dr. Tiffany Field, of the University of Miami Department of Pediatrics (APA Press Release, 1997). Kelly and Jennings (2003) recently reported a complex relationship between maternal depression and toddlers’ displays of helplessness. While elevated depression symptoms were associated with toddlers’ helplessness, analyses revealed this link was moderated by maternal behavior. Depressed mothers who also showed greater negativity in interaction had toddlers’ with higher levels of affect-related helplessness. Another recent study found that at age 3 ½ years, children of depressed mothers displayed increased levels of internalizing and externalizing behavior problems and reduced generalized brain activation as measured by EEG (Dawson, Ashman, Panagiotides, Hessel, Self, Yamada & Embry, 2003). A study conducted by Petterson & Albers (2001) found that children of depressed mothers exhibited lower Denver Developmental Screening Test (DDST) scores, cognitive and motor development than those of children with non-depressed mothers. Conway and Kennedy (2003) examined factors associated with maternal depression. The authors used a standard infant health production model and found that depression has a negative effect on birthweight. They also note that their research suggests that treating maternal depression is a promising new approach to improving infant health and one that warrants further investigation.

Dr. Field researched various treatment options including tactile/kinesthetic stimulation or massage therapy and found that infants treated with massage therapy showed improved sleep, cried less, were more responsive to others and had decreased stress hormone levels. (Pelaez-Nogueras, Gewirtz, Field, Cigales, Malphurs, Clasky & Sanchez, 1996). Other

treatments have included interaction coaching where the infant and mother are left to play in an observation room while a coach gives the mother instructions on how to positively interact with her infant. If mothers are unresponsive with their infants, game-playing techniques are taught. If mothers overstimulate their infants, slowing techniques are taught. Video feedback is then provided for the mother to practice these interactions at home after the session(s). A study evaluating the efficacy of psychotherapy in offspring of depressed mothers found that preventative intervention is significant in safeguarding cognitive development in at-risk toddlers (Cicchetti, Rogosch & Toth, 2000).

## Survey of Client Records Results

The survey of client records results include the following:

**Employment/Education:** As depicted in Table 4, only six (11.8%) clients were employed at the onset of treatment. However, 25 (49%) actively sought work during treatment, and 9 (17.6%) of them found work during the course of treatment. A substantial number (12, or 23.5%) attended school during treatment, and two completed high school or received their GED. One client completed training during the course of treatment. Thus, a total of 19 individual clients (or 37%) either went to work (9), attended school (12), received a GED/high school diploma (2) or completed training (1).

**Table 4. Employment/Education Results from Women Receiving Treatment for Depression.**

Survey Question	Number of Clients	Percent of Total
Employed at Onset	6	11.8
Sought Work	25	49.0
Went to Work	9	17.6
Attended School	12	23.5
GED/HS Diploma	2	3.9
Completed Training	1 (CDA*)	2.0

\* Child Development Credentials

**Family Status:** Among families receiving treatment, four were involved with DCF. One family had children removed during treatment. While in treatment, the family worked on reunification and was successfully reunified. In another family, the children had already been removed from the home at treatment initiation; subsequent work on reunification was successful. In two families, older children had been removed prior to treatment. While the older children remained out of the home during treatment, these mothers were able to keep custody of their infants during treatment. This indicates some success as their other children had been removed and typically the newborn would also be removed if a parent was “unfit”.

**Pregnancy Outcomes:** As would be expected in a project aimed at perinatal women, approximately 75% (or 38) of the 51 respondents came into treatment during their pregnancy, and an additional four (7.8%) became pregnant during their treatment (See Table 5). The vast majority of clients (42 out of 51 or 82%) were pregnant during treatment. Of these 42 pregnant women in treatment, 19 (45%) gave birth during the course of treatment for depression. Eighteen women had live births and one miscarried. Of these, 11 delivered healthy full-term babies, and two delivered full-term low birthweight babies. Two mothers had singleton babies who were premature. Two mothers had twins. One mother had an infant who died. Regarding birth control methods, 13, or about 25% of the respondents, used depovera, tubal ligation or any other birth control methods during the course of their treatment (Table 6). Interestingly, not one client used birth control pills.

**Table 5. Pregnancy Outcomes Results from Women Receiving Treatment for Depression.**

Survey Question	Number of Clients	Percent of Total Women Surveyed
Already Pregnant	38	74.5
Became Pregnant	4	7.8
Total Pregnant During Treatment	42	82%
Gave Birth	19	45%

**Table 6. Women’s Self Reported Birth Control Methods During Treatment for Depression**

Survey Question	Tubal Ligation	Depovera	Other Form of Birth Control	No Answer
Follow-Up Visit	3	7	3	38

## **Economic Analysis of Maternal Depression**

### **Cost Methodology**

The data elements that were used to determine costs of the program included the initial annual investment of \$75,793, or \$113,690, for the 18 months time period, including salary and operating costs, with an average cost of \$466 per 244 screened clients, and \$2,229 per client (51) served.

### **Benefit Methodology**

For this study, benefits were estimated based on results from the Maternal Depression Projects’ client records, the Infant Mental Health Pilot Project outcomes and maternal

depression and infant mental health literature. While the benefits drawn from the literature are not identical to the Maternal Depression Project, they are sufficiently representative of the categories and causal impacts associated with maternal depression. In the judgment of the research economists completing this project, these initial analyses should provide policy makers with sufficient quantitative insights as to the direction and magnitude of maternal depression benefits on which to benchmark and evaluate future expansion of these programs to a broader client base.

The Florida Infant Mental Health Pilot Project was recently completed. Since the majority of mothers in that project were also depressed, and because maternal depression has substantial negative effects on infant mental health, some of the benefits from this project can be applied to the maternal depression project. The Infant Mental Health Pilot Project's Goal 1 (to improve parent/caregiver and child interaction and relationships, reduce occurrence or reoccurrence of abuse and neglect, and enhance the child's developmental functioning) <sup>3</sup> had four outcomes. First, there was a reduction of child abuse and neglect, as evidenced by a 100% reduction of child and neglect reports of those completing the pilot project. The second outcome included reunification with the family or permanent placement for all the children who were not in parental custody at the beginning of the program. The third outcome resulted in a 58% improvement in developmental functioning of the children. Lastly, the parent-child relationship function improved significantly for both parent/caregivers and children, i.e., parents showed an increase in behavioral and emotional responsiveness with their children and a decrease in intrusive behaviors, and children showed an increase in positive affect (emotions) and enthusiasm with their parents. Seventy percent of parents/caregivers reported minimal to no depression after treatment.

If there were 100% (or 4) fewer child abuse/neglect reports filed resulting from treatment for maternal depression, the savings from abuse investigations would be \$2,488 over the study period.

Concerning a reduction in out-of-home placement, according to the maternal depression survey of client records, two women were reunited with their children during the course of treatment, resulting in a conservative estimate<sup>4</sup> of savings of \$27,000 for out-of-home placement for the average foster care length of stay time period, of 13.1 months.

Regarding the maternal depression project treatment population, there were 396 counseling sessions attended by the clients. The average cost of treating maternal depression in Gadsden County is \$100/session. If 47% of the clients (or 24 completers) experienced minimal to no depression after completion of the program, this would result in a cost avoidance of \$18,720 (This is calculated as savings from 24 clients not needing an average of 7.8 sessions at \$100 per session).

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<sup>3</sup> Program Evaluation: Florida Infant Mental & Young Child Mental Health Pilot Project Year 3, Final Report July 1, 2000—June 25, 2003 (Center for Prevention & Early Intervention Policy, 2003)

<sup>4</sup> Becky Lyons, Department of Children and Families, Chief, Child Welfare/CBC Resource Management, October 13, 2003



A recent study published in the Journal for the American Medical Association (JAMA)<sup>5</sup>, revealed that depression ranks among the most costly of conditions for employers. The cost of depression in the workplace is 4.1 hours per week. During the study period, a total of 15 clients were working or found employment resulting in a savings to employers of \$24,705 over the study period (assuming clients were employed at minimum wage of \$5.15/hour).

A recent study of the economic impact study of the Florida State University System (SUS) conducted by Lynch, Smallwood and Barnes (2001) found that there were significant lifetime earnings differences among High School, Bachelor's, Master's and Doctoral graduates when compared to non-high school graduates. When the lifetime earnings data was applied to the Gadsden County Maternal Depression Project, this results in an increase in maternal depression client earnings for the two high school graduates, of approximately \$530,734 (in 2002 dollars). Table 7 depicts the costs and benefits. Table 8 provides references for the estimates in Table 7.

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<sup>5</sup> Cost of Lost Productive Work Time Among US Workers with Depression. (Stewart, W. F., J. A. Ricci, E.Chee, S. R Hahn, and D. Morganstein, 2003)

**Table 7. Cost and Benefits of the Gadsden County Maternal Depression Project**

<b>Maternal Depression Project Cost/Benefit</b>	<b>Dollars (2002)</b>
<b>Program Cost</b>	\$113,690
<b>Program Benefits</b>	
Reduction in child abuse/neglect	\$2,488
Reduction in out-of-home placement	\$27,000
Reduction in depression treatment	\$18,720
Enhanced productivity at workplace	\$24,705
Enhanced lifetime earnings through increased high school graduation rates	\$530,734
<b>Total Benefits</b>	\$603,647
<b>Net Benefits</b>	<b>\$489,957</b>

**Table 8. References for Additional Benefits, or Cost Avoidances, of Treatment of Maternal Depression in 2002 Dollars.**

<b>Benefit/Cost Avoidance</b>	<b>Reference</b>
Cost of abuse investigation, in/out of home care is \$622 per child.	Florida Department of Children and Families, Child Welfare/Community Based Care Program Office.

<b>Benefit/Cost Avoidance</b>	<b>Reference</b>
The average cost per child for out-of-home placement is approximately \$1,000 per month. The average length of stay for a child for out-of-home placement is 13.1 months. Included also is an average of \$1,000 comprehensive assessment and \$500 mental health services for a total of \$13,500 per child.	Florida Department of Children and Families, Becky Lyons, Personal Communication. Source: ACHA, Mental Health)

<b>Benefit/Cost Avoidance</b>	<b>Reference</b>
The average cost for depression treatment = \$100/hour	Apalachee Center, Inc., Gadsden County Personal communication, Linda Boles, Outpatient Insurance Department

<b>Benefit/Cost Avoidance</b>	<b>Reference</b>
The average lost productive hours per week from depression is 4.1 hours (5.6 hours due to depression minus 1.5 expected hours).	JAMA, June 2003. The Cost of Lost Productive Work Time Among US Workers with Depression.

<b>Benefit/Cost Avoidance</b>	<b>Reference</b>
Enhanced lifetime earnings through increased high school graduation rates, estimated at the low range of 2 high school graduates.	Lynch, Tim. Creating Florida's Future: Measuring the Economic Impact of the State University System in Florida and The Early Training Project, 1983

## **Conclusions**

Studies of depression have found that economic costs, in terms of treatment costs and lost earnings due to mortality and morbidity are quite large (Greenberg et al, 1993a, b). Conway and Kennedy (2003) stress that addressing the problem of depression within the low-income population has benefits that extend well beyond employment into the production of infant health. They suggest that there are some cost effective ways to improve infant health through the Medicaid Program – by supplementing the recent increased Medicaid funding levels with greater attention to screening for and treatment of maternal depression.

The inferences made in this benefit cost analysis are not intended as substitutes for essential follow-up evaluations that should be included as a component of the Maternal Depression Project. Given that the benefits were positive and substantial, expanded programs should embrace a long-range research mission, and conduct critical post-treatment analysis.

The gross benefit cost ratio for the Maternal Depression Project is 5.31, indicating that for every \$1 invested, \$5.31 is saved. The benefit-cost analysis indicates that the net savings to the government from changes to the mother and child total \$489,957, more than four times the program's costs.

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## Appendix A

### Case File Review Form

Client # ..... Client Therapist: ..... Date form completed: .....

#### Employment/Education

**1. Client was employed a onset of treatment?**

Yes  No

**2. Client sought work during treatment?**

Yes  No

**3. Client went to work during treatment?**

Yes  No

**4. Client attended school/training during treatment?**

Yes  No

**5. Client completed GED/HS Diploma during treatment?**

Yes  No

**6. Client completed training during treatment?**

Yes  No

**7. Type of training? \_\_\_\_\_**

#### Family Status

**8. Department of Children and Families (DCF) involvement during treatment?**

Yes  No

**9. If yes to #8, children were in home at onset of treatment?**

Yes  No

**10. If yes to # 9, children were removed from home during treatment?**

Yes  No

**11. If yes to # 10, children were placed in foster home/kinship care during treatment?**

Yes  No

12. If yes to # 10 or No to #9, client were reunified during treatment?

Yes  No

13. If yes to # 10 or No to #9, client worked on reunification during treatment?

Yes  No

14. If yes to #8, newborn/child under 12 months remained in home during treatment?

Yes  No

#### Pregnancy Outcomes

15. Client was pregnant at onset of treatment?

Yes  No

16. Client became pregnant during treatment?

Yes  No

17. If yes to #15 or #16, client gave birth during treatment?

Yes  No

18. If yes to #17, live birth and baby was

full term

premature (The current World Health Organization definition of prematurity is a baby born before 37 weeks of gestation, counting from the first day of the Last Menstrual Period (LMP).)

low birth weight (LBW) = less than 2500 grams or about 5 ½ pounds at birth

19. If yes to #17, mother attended follow-up family planning visit and chose form of birth control?

tubal ligation

depovera

birth control pills

other form of birth control